

Claims

- [c1] 1.A fuel cell unit comprising:
- (a)an upper interconnect comprising a top plate and a lower plate enclosing a sealed interior chamber and defining an intake and an exhaust manifold opening in fluid communication with the chamber, wherein the lower plate defines a cell opening;
 - (b)a lower interconnect comprising a lower plate and an upper plate enclosing a sealed chamber defining an intake and an exhaust manifold opening in fluid communication with the chamber, wherein the upper plate defines a cell opening;
 - (c)a fuel cell cassette comprising:
 - (i)a single planar fuel cell element having an anode surface, a cathode surface and an edge surface;
 - (ii)a resilient seal element which contacts both flat surfaces and the edge surface; and
 - (iii)a frame that retains both the seal and the ceramic cell element;wherein the fuel cell cassette fits within the upper interconnect cell opening and mates with the upper interconnect to seal the upper chamber and the fuel cell cassette fits within the lower interconnect cell opening and mates with the lower interconnect to seal the lower chamber; and
 - (d)seal means disposed between the upper and lower interconnects.
- [c2] 2.The fuel cell unit of claim 1 wherein the shape of each of the upper and lower interconnects is substantially rhomboidal, comprising a substantially square central portion and manifold portions which project outwards on opposing sides of the central portion.
- [c3] 3.The fuel cell unit of claim 1, wherein the fuel cell cassette frame comprises an upper portion and a lower portion which are joined together to retain the seal between the upper and lower portions.
- [c4] 4.The fuel cell unit of claim 1, wherein the joining of the upper and lower fuel cell frame portions of the cassette compresses an inner ring portion of the upper and lower seals against the ceramic cell element and an outer ring

portion of the upper and lower seals against each other.

- [c5] 5.The fuel cell unit of claim 1 wherein the cassette has a seal that is made from a flexible, resilient material.
- [c6] 6.The fuel cell unit of claim 5 where the seal comprises a matrix of ceramic fibres.
- [c7] .hTe fuel cell unit of claim 6 wherein the ceramic fibres comprise alumina, zirconia, or combinations of both.
- [c8] 7e.T fuel cell unit of claim 7 wherein the seal further comprises ceramic powder.
- [c9] 8. .Tfuel cell unit of claim 8 wherein the ceramic powder comprises alumina powder or zirconia powder or a combination of both.
- [c10] 10.The fuel cell unit of claim 2, wherein the upper interconnect and lower interconnect are substantially identical in shape.
- [c11] 11.A fuel cell stack comprising a stacked plurality of fuel cell units as claimed in claim 1.